PHOTOCATALYTIC EFFICIENCY OF TITANIUM OXIDE/MOLYBDITE OXIDE POWDER MIXTURE

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Abstract
Coupling TiO_2 with MoO_3 is one of many strategies for the enhancement of titanium oxide photoabsorption under the solar light irradiation. TiO_2 being a wide band-gap semiconductor with its unique properties (nontoxicity, photo and chemical stability, and low-cost) is a prominent material for the photocatalytic applications but only when excited by the UV light [1]. Here we report for the first time the photocatalytic efficiency of mixed $2TiO_2/MoO_3$ powders prepared using a simple, mechanochemical solid-state chemistry procedure at a relatively low temperature of 700 °C. Materials structure was examined by means of X-ray diffraction that confirmed the presence of three phases, rutile TiO_2, anatase TiO_2 and molybdite MoO_3 [2]. A unique heterojunction structure with Ti-O-Mo bond between the TiO_2 and MoO_3 interfaces enables the solar light-driven photocatalytic reaction as well as more efficient separation of the photogenerated electrons and holes for the overall improvement of TiO_2 photocatalytic performance. The mixed titanium oxide/molybdite oxide photocatalytic activity was examined under simulated solar irradiation and the experimental photocatalytic kinetics showed that the obtained $2TiO_2/MoO_3$ powder mixture has a good potential for Vis-activated degradation of ciprofloxacin, a widely used antibiotic for the treatment of a number of bacterial infections, which is the reason why it was continuously introduced into the environment through wastewaters, and therefore represents a potential risk for the living organisms.

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